

HC1 MLS validation results: comparisons with other satellite data

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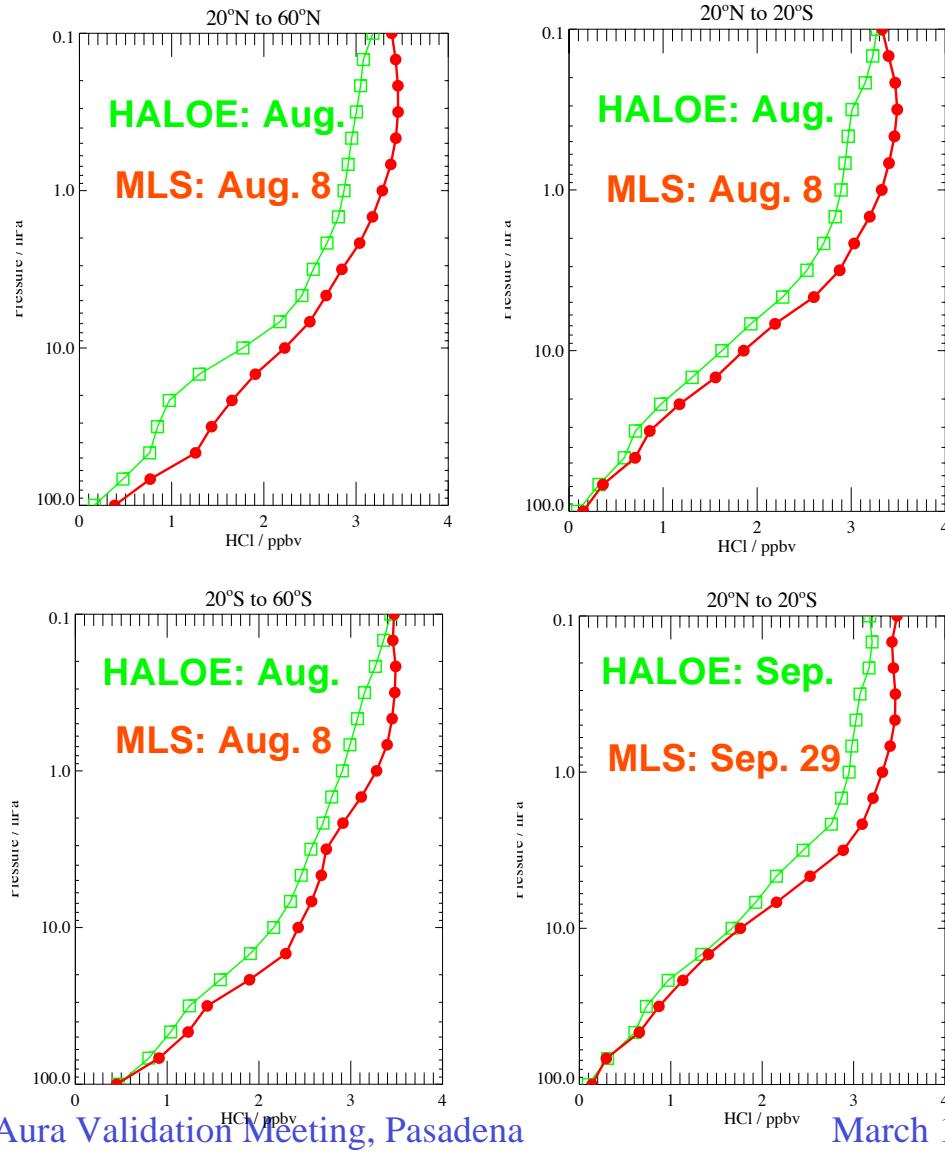
Nathaniel Livesey, Bill Read, Joe Waters & MLS team

ACE team

+ thanks to satellite teams from HALOE, SAGE II, POAM III

HCI MLS validation results: comparisons with other satellite data

HCI: Sample Comparisons of MLS and HALOE



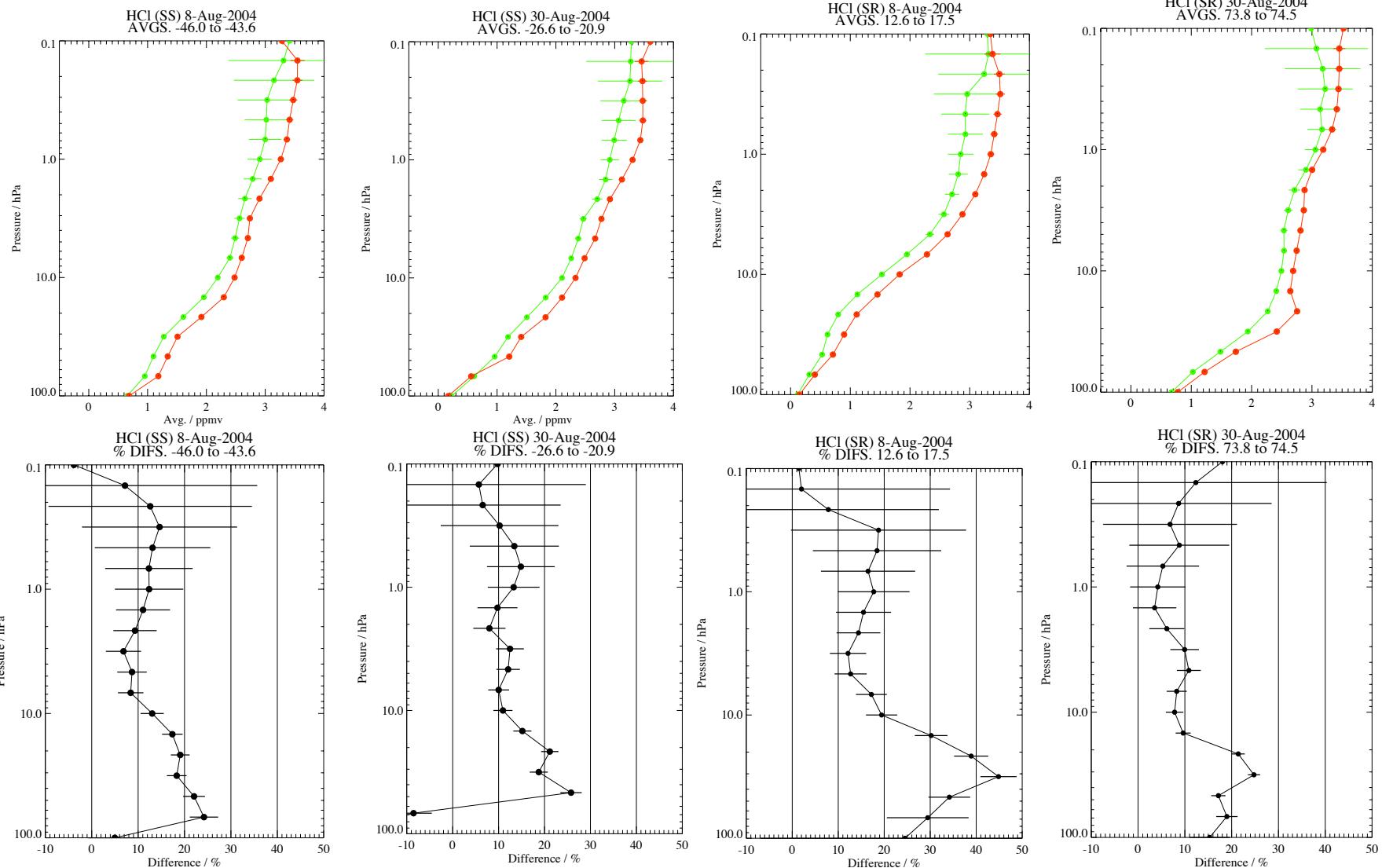
Simple zonal mean profiles of HCI from MLS (1 day's data) and HALOE (average over ~a month) show some systematic differences. Coincident profiles (and averages) also show this difference, but with poorer precision.

In upper stratosphere,
MLS HCI > HALOE HCI by ~ 10%

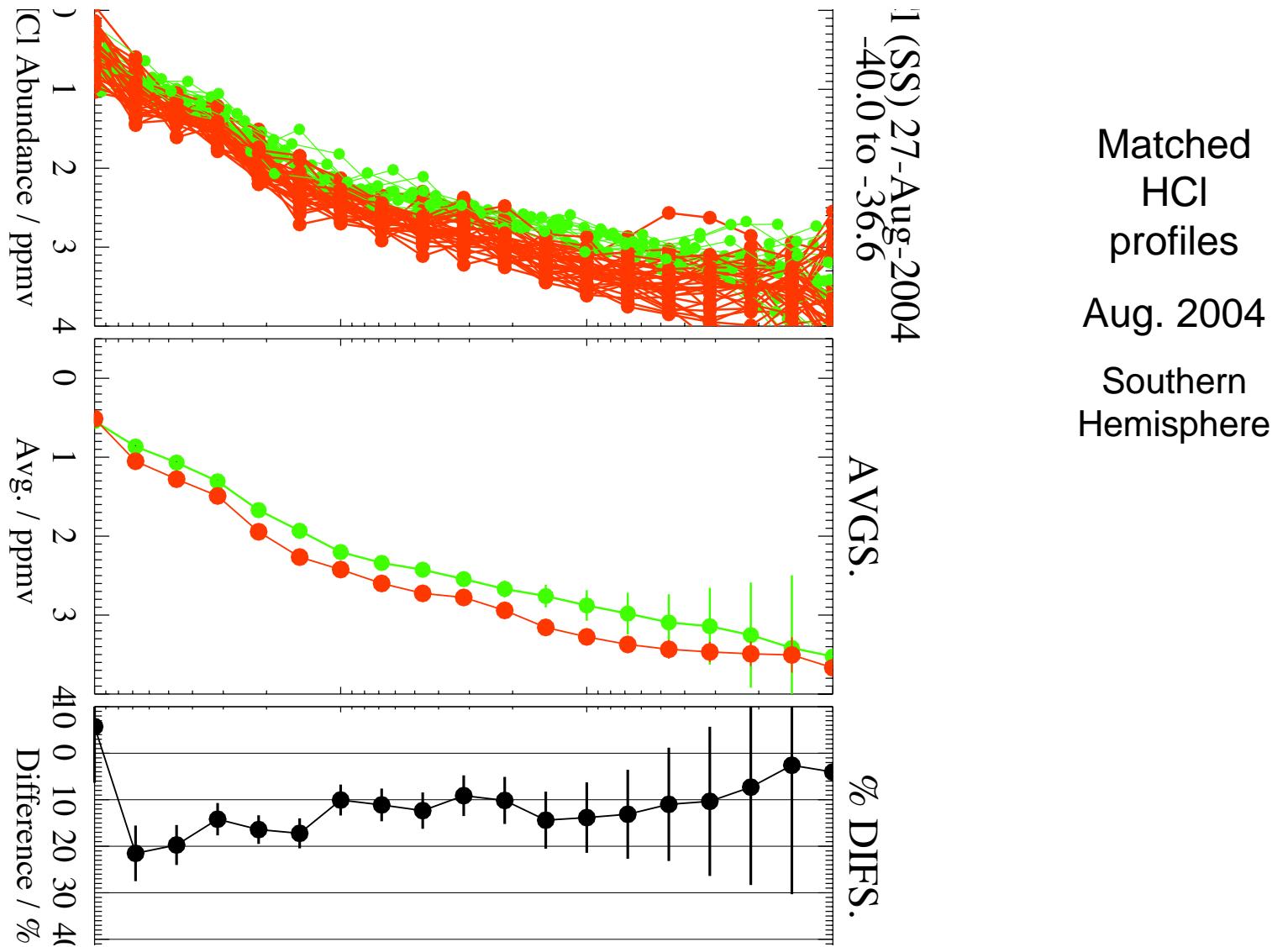
In lower stratosphere,
MLS HCI > HALOE HCI by ~ 20%,
but can be > by more than 40%
(see next slide).

HCl MLS validation results: comparisons with other satellite data

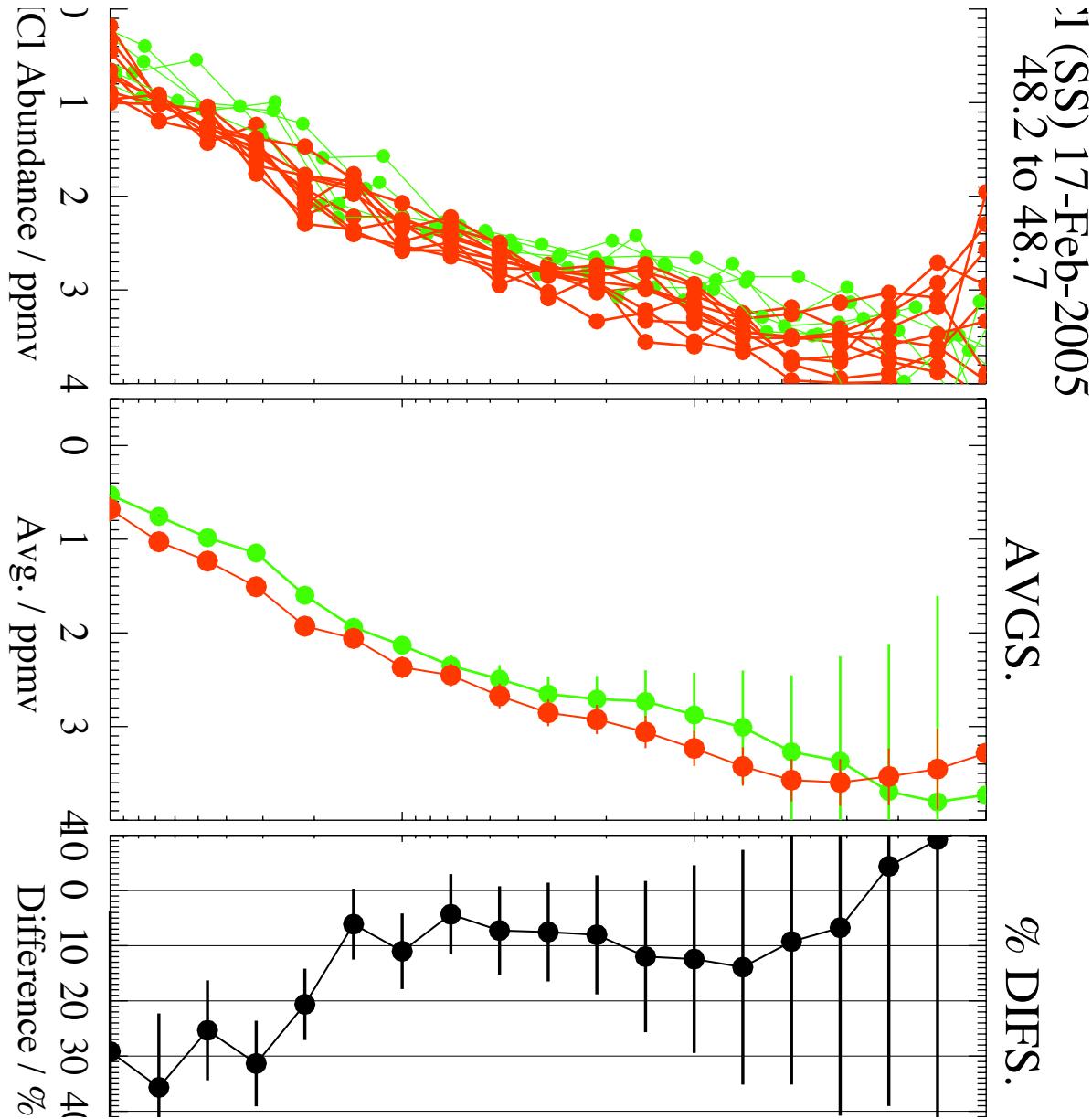
HCl: Sample Comparisons of MLS and HALOE



HCI MLS validation results: comparisons with other satellite data

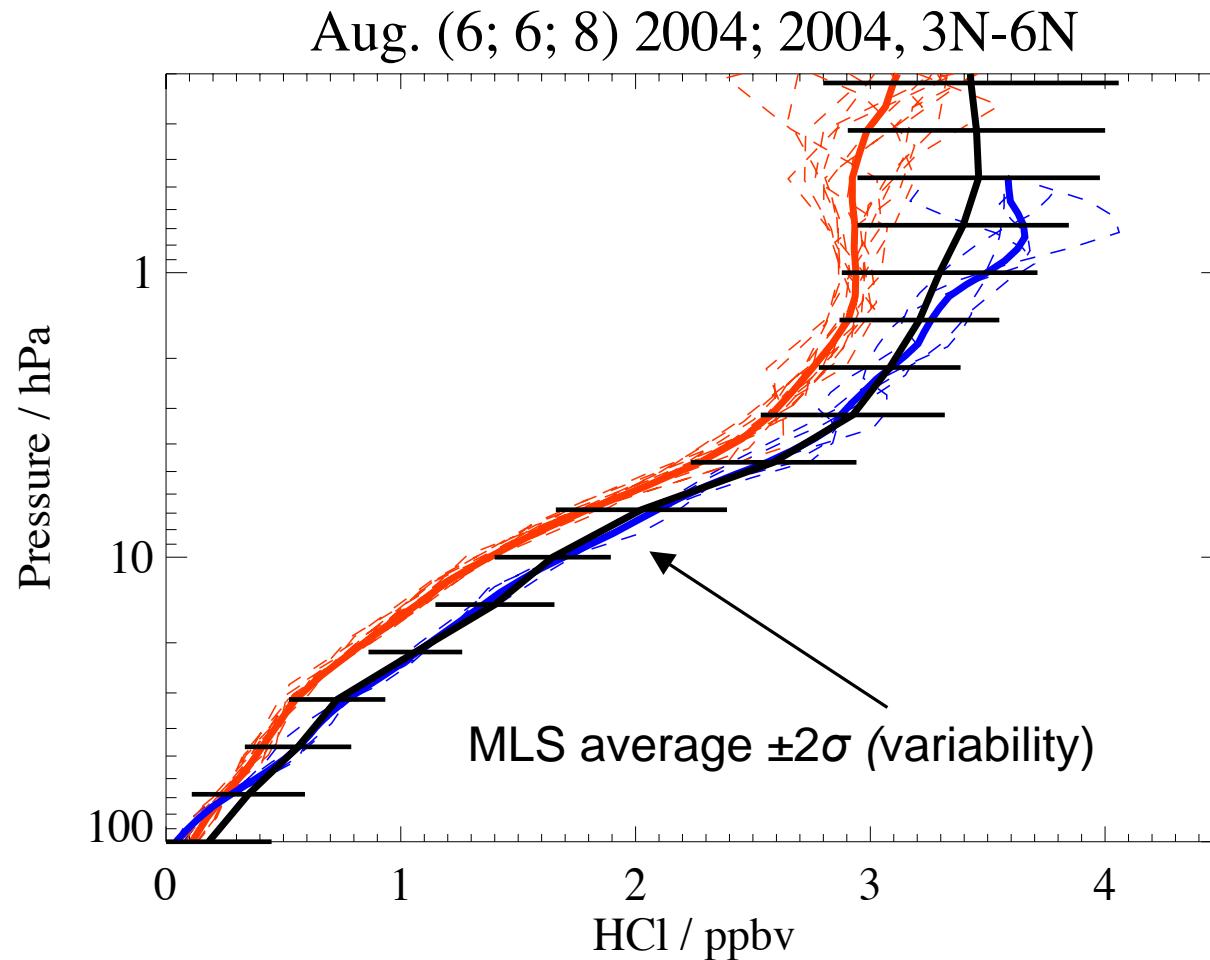


HCI MLS validation results: comparisons with other satellite data



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HCI: Sample Comparisons of ACE-FTS, HALOE, and MLS

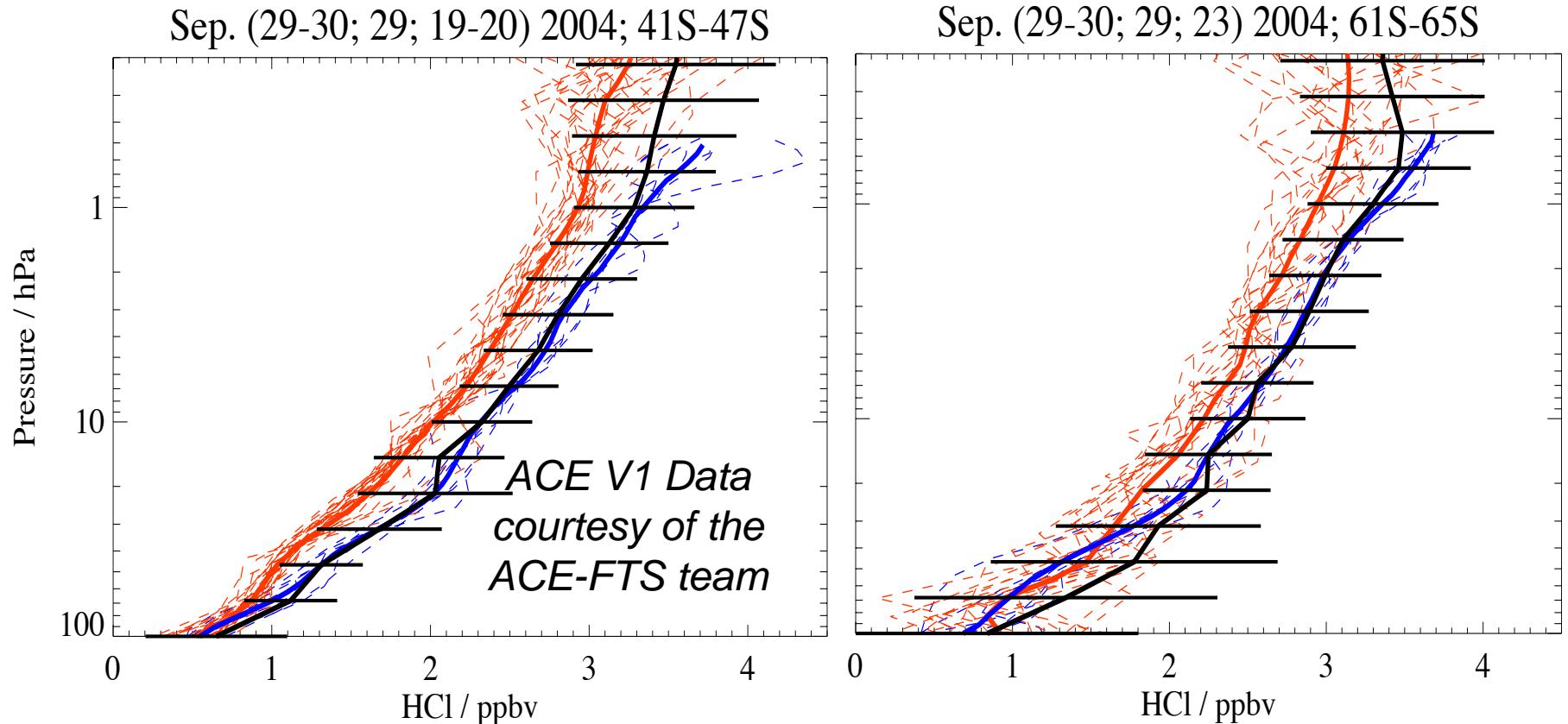


HALOE HCI
abundances are
lower than both
MLS & **ACE**
values

*ACE V1 Data
courtesy of the
ACE-FTS team*

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HCI: Sample Comparisons of ACE-FTS, MLS, and HALOE



Two other HCI comparisons show similar differences as those for early August/tropics.

- **Upper Stratosphere:** HALOE abundances < MLS and ACE-FTS abundances.
- **Lower Stratosphere:** MLS values > both ACE and HALOE at times (see 63S above); more comparisons needed to evaluate this. **See Ft. Sumner results from L.F. et al.**

HCI MLS validation results: comparisons with other satellite data

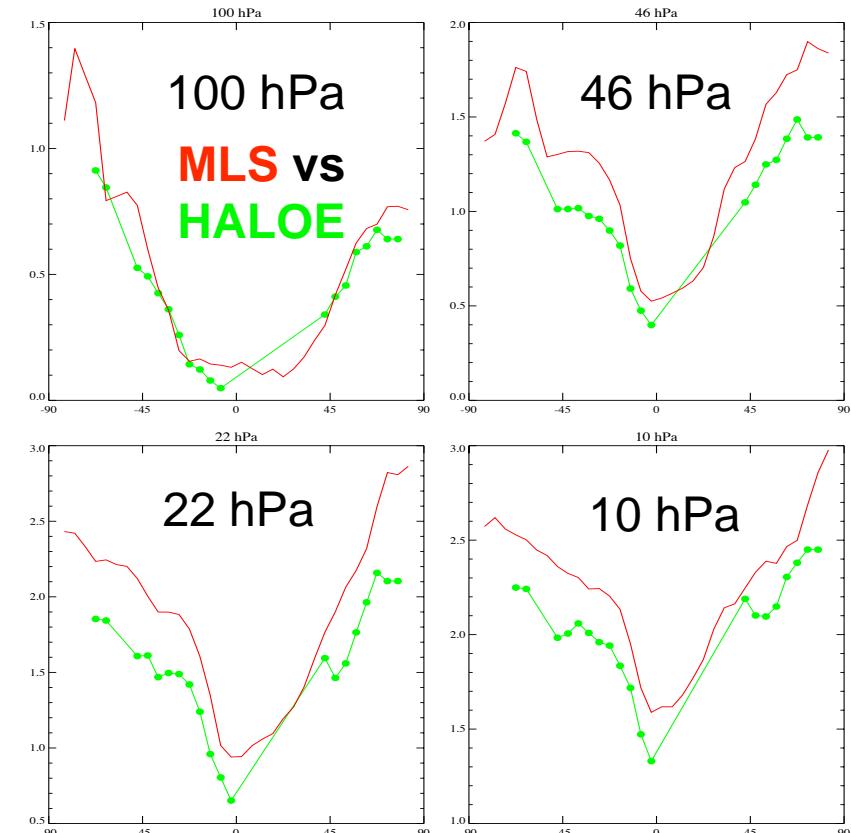
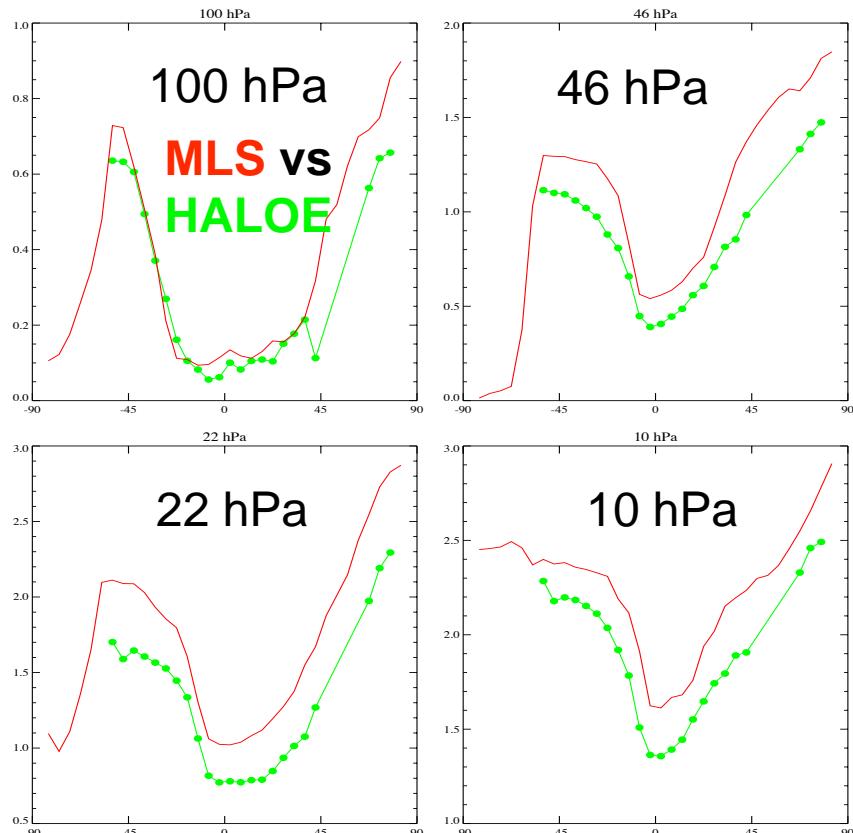
HCI Latitudinal Variations: **MLS** and **HALOE**

Latitudinal variations are well captured by MLS retrievals, in simple comparisons of one day's retrievals (MLS) versus monthly average for HALOE.

Will need more months to study the time variation versus the HALOE time series.

AUGUST 2004

SEPTEMBER 2004



Aura Validation Meeting, Pasadena

March 1, 2005

L. Froidevaux et

HCl MLS validation results: comparisons with other satellite data

Status:

Morphology and evolution: look quite reasonable (global, SH polar region) , including latitudinal variations (as compared to HALOE).

Lower stratosphere: MLS abundances are typically > than HALOE values, by 10-30%, more so (in %) at low latitudes.

Upper stratosphere: MLS (and ACE) values > HALOE values (by ~ 10%).

Notes: HALOE values have tended to be lower than other data (balloons and ATMOS) by a similar amount [*Russell et al., JGR, 1996*], even if not outside the error bars.

- MLS (& ACE) HCl in upper stratosphere/lower mesosphere [0.3-0.5 hPa] ~ 3.5 ppbv. MLS absolute accuracy is ~ 0.3 ppbv (2 σ) [preliminary estimate – spectroscopy and calibration uncertainties should yield ~ 5% (2 σ), as largest contribution].
- Inferred total chlorine value ~ 3.7 ppbv (\pm 0.3 ppbv), based on MLS data.

This seems high compared to expectations from ground-based source gases and subsequent transport into stratosphere, i.e. ~ 3.4 ppbv [WMO, 2002]; error in this number requires further study (total error ~ 0.1 ppbv, or maybe more?).

Plans:

- Biases: HALOE, MLS, and ACE error bars/sources warrant further investigation; e.g., HALOE retrievals use older HITRAN spectroscopic data, ACE does not.
- Do more comparisons, summarize statistics, track temporal evolution.